

DESCRIPTION

"Device for automatic reading of a plurality of codes by means of a single key code."

FIELD OF THE INVENTION

The present invention concerns a device for automatic reading of a plurality of codes by means of a single key code.

More particularly, the invention refers to a device for example, in the form of a key ring or desk accessory or some similar item inside which it is possible to enter access codes for mobile phones, automatic bank distributor cards, credit cards, etc.

BACKGROUND OF THE INVENTION

It is well known that the use of computerised and/or electronic systems requires an increasing number of alphanumeric and/or word key codes for access to the services in question.

Certain examples of this type of code are those used for phone cards, automatic bank distributor cards, or credit cards. These can also include codes and combinations for safes or safety boxes, access codes to Internet sites or to burglar alarm systems.

It is obvious that the user must remember a certain number of alphanumeric codes that, for security reasons, cannot be written anywhere that can be easily read by

others. The difficulty in remembering all these essential alphanumeric codes is obvious, and in addition this problem is increased by the fact codes need to be changed regularly for security reasons.

The facts stated above demonstrate the need for a device that can contain all the secret codes without making the codes themselves immediately visible, and that can make all necessary codes available by simply entering and remembering a single key code.

The basic problem in relation to the present invention is to provide a device for the automatic reading of a plurality of codes through a single key code, and whose structural and functional characteristics are able to satisfy said needs.

SUMMARY OF THE INVENTION

This problem can be solved by a device for automatic reading of a plurality of codes through a single key code as described in claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages provided by this device for automatic reading of a plurality of codes by means of a single key code according to this invention will be easily understood from the following description including preferred embodiment examples which are indicative but by no means limiting, with reference to

the attached drawings wherein:

Figure 1 illustrates a partial cross section side view of a device according to this invention;

Figure 2 illustrates a partial cross section side view of a detail of the device illustrated in figure 1;

Figure 3 illustrates an axonometric view of a possible embodiment of a detail shown in figure 1;

Figure 4 illustrates a view from above of the detail shown in figure 3;

Figure 5 illustrates a view from above of a possible embodiment of a detail shown in figure 1;

Figure 6 illustrates a perspective partial cross section view taken along the line VI-VI of the detail shown in figure 5;

Figure 7 illustrates a view from above of an embodiment of a detail shown in figure 1;

Figure 8 illustrates a side view of a detail shown in figure 7;

Figure 9 illustrates a cross section view taken along the line IX-IX of the detail shown in figure 7;

Figure 10 illustrates a schematic diagram of the system shown in figure 1 that also corresponds with the layout of a possible embodiment of the device itself;

Figure 11 illustrates an axonometric view of a detail of the system shown in figure 1;

Figure 12 illustrates the axonometric view of the detail shown in figure 11 in a cross section view taken along the line XII-XII shown in figure 11;

Figure 13 illustrates a perspective view of a possible embodiment of the device according to the present invention;

Figure 14 illustrates a side view of the device shown in figure 1;

Figure 15 illustrates the horizontal section of the device shown in figure 1;

Figure 16 illustrates a cross section view taken along the line XVI-XVI of the device shown in figure 15;

Figure 17 illustrates a cross section view of figure 16 wherein certain details have been omitted to provide a clearer view of other details;

Figure 18 illustrates a cross section view taken along the line XVIII-XVIII of the device shown in figure 14;

Figure 18a illustrates a plan view of the device shown in figure 13 seen from underneath;

Figure 19 illustrates a side view of a detail of the device shown in figure 13;

Figure 20 illustrates a cross section view taken along the line XX-XX of the detail shown in figure 19;

Figure 21 illustrates a side view of a detail of the

device shown in figure 13;

Figure 22 illustrates a cross section view taken along the line XXII-XXII of the detail shown in figure 21;

Figure 23 illustrates a cross section view taken along the line XXIII-XXIII of the detail shown in figure 21;

Figure 24 illustrates a cross section view taken along the line XXIV-XXIV of the detail shown in figure 21;

Figure 25 illustrates the cross section view of figure 16 where certain details have been omitted to provide a clearer view of other details;

Figure 26 illustrates the cross section view of figure 16 where certain details have been omitted to provide a clearer view of other details;

Figure 27 illustrates the cross section view of figure 16 where certain details have been omitted to provide a clearer view of other details;

Figure 28 illustrates a plan view of a detail of the device shown in figure 13;

Figure 29 illustrates a plan view of a detail of the device shown in figure 13;

Figure 30 illustrates a cross section taken along the line XXX-XXX of the detail shown in figure 29;

Figures 31-33 illustrate the device shown in figure 18 in different working conditions;

Figure 34 illustrates a side view of a possible embodiment of a device according to the present invention;

Figure 35 illustrates a view of the area shown by arrow XXXV of the device shown in figure 34;

Figure 36 illustrates a view of the area shown by arrow XXXVI of the device shown in figure 34.

DETAILED DESCRIPTION OF THE INVENTION

With reference to these figures, the number 10 identifies the device for the automatic reading of a plurality of codes by means of a key code.

According to the example of embodiment illustrated in figure 1, the device in question can, for example, assume the shape and size of a key ring or an accessory for application on a computer monitor or on an office desk, and can contain a set of drums 12 suitable for rotating around a longitudinal axis 14.

In the example shown in figure 1, eight drums have been foreseen, to be aligned alongside each other in the direction parallel to the axis 14.

An example of the embodiment of a drum 12 is illustrated in figures 5-9 and comprises a disk shaped plan 16 comprising at least one concentric ring with

respect to said axis 14. In correspondence with the axis 14, the disk plan 16 includes a through seat 18 of basically cylindrical form.

Around the external ring portion of disk plan 16 that forms the perimeter, are a set of pins 20, distributed at a uniform distance from each other, extending in a direction parallel to the rotation axis 14. These pins will be described further on as axial pins.

In the example shown in figure 5 or 6 the axial pins are preferably variable in diameter. In particular a first set of pins has been foreseen with a larger diameter, and a second set of pins with a smaller diameter. Preferably the pins of one set alternate with the pins of the other set.

Moreover, the pins illustrated in figures 5 or 6 present a structure that is axially hollow.

A drum 12 also comprises means for stepwise rotation 22 in order to rotate each drum by a pre-determined angle compared to the drum immediately adjacent. A possible embodiment of the stepwise rotation means 22 is illustrated in figure 6 or 9 and provides that said stepwise rotation means 22 comprises a side wall 24 that extends from said plan 16 in a co-axial manner to the through seat 18 and to the longitudinal axis 14. This

side wall 24 forms a cylindrical seat 26 co-axial with the through seat 18.

Advantageously, the internal surface of the side wall 24 presents a knurled portion with grooves and cogs formed in a direction parallel to the axis 14.

Extending from the part opposite plan 16 with respect to wall 24 is another cylindrical wall 30 that forms said through seat 18. Extending radially from the external side surface of said further cylindrical wall 30 are several ribs or small blades 32 that interact with the knurled portion 28 of the drum immediately adjacent.

Reference numeral 34 identifies in a general manner some inserts equipped with faces 36 carrying distinctive elements, such as, for example, alphanumeric characters, or graphical symbols or even colours. One of these faces 36 will be visible in the assembled device.

The inserts 34 can assume various configurations. In figure 5 the drum 12 is suitable for housing two types of inserts in alternating position. A first type of insert is a quadrangular based prism on which the four side faces each carry a distinctive element. A second type of insert is a triangular based prism on which each of the three side faces carries a distinctive element.

Preferably, the adjacent inserts mounted on the respective drums are in contact with each other so that

their side faces touch and are therefore not visible from the outside of the device.

The inserts 34 are adapted to be connected in a releasable manner along the external side edge of each of the said drums 12, in other words, in correspondence of the annular portion of plan 16. In fact, each insert 34 has a seat 37 that is preferably cylindrical of a size suitable to house one of the axial pins 20. In particular, according to the example shown in figure 5, the pins with a larger diameter are designed to interact with the inserts having a quadrangular base, while the pins with a smaller diameter are intended for interacting with the triangular base inserts.

The corresponding pins and prisms are preferably shaped so that the prisms can be attached and detached from the pins with slight pressure.

Reference numeral 38 indicates a rod adapted to receive the drums 12 set next to each other in axial direction. In fact, the through seats 18 form a seat suited to receive the rod 38 so that it forms the axis 14 around which the drums rotate.

Preferably a stop 40 will be fixedly attached to one end of the rod 38. In the example illustrated in the figures, the first stop 40 is formed by a slightly convex disk with a radial extension equal to the radial

extension of the drums.

Moreover a second stop 42 is provided (figures 3 and 4) for insertion on the rod 38 at the opposite end to that which is attached to the first stop 40. This stop is designed to be fixedly attached to the rod so that it blocks the drums axially. In the example illustrated in the figures, the second stop 42 has the same form as the first stop 40 and is inserted in the rod 38 in a specular manner.

A locking member 44 prevents the drums 12 and the second stop 42 from slipping from the rod. The drums are shaped so that they can be attached to as to permit an axial rotation, or detached from each other with slight pressure. The locking member 44 is in form of a cap which can be inserted, preferably with a snap action onto the free end of the rod.

According to a possible embodiment, the locking member 44 comprises a gripping device 46 that, in the examples shown in the figures, is composed of a ring that makes the device suitable for use as a key ring.

The assembly and the functional use of the device for automatic reading of a plurality of codes through a single key code illustrated previously and according to the present invention will be described further on.

The inserts 34 are combined with the relative drums

by choosing the insert and the respective visible face according to the key code and the codes to be remembered. Figure 10 shows the linear development of the external edge of certain drums, or in other words, the sequence of the visible insert faces.

To simplify the description, the linear development of eight drums 12 for the embodiment of the device shown in figure 1 have been indicated with the letters A to H.

According to the example in figure 10, each drum comprises a triangular based insert alternated with a quadrangular based insert for a total of twelve inserts 34. The triangular based inserts are identified with the reference numbers t1 to t6 while the quadrangular based inserts are identified with numbers d1 to d6.

The drums 12, and in particular their linear development illustrated in figure 10 are positioned adjacently in a line parallel with axis 14 so that the distinctive elements of several drums are aligned.

In the case of triangular based inserts, the side faces are three in number and therefore it is possible to choose between three different distinctive elements in the case where these inserts are previously pre-molded and pre-engraved. This is identical for the quadrangular based inserts where there is a choice possibility among four different distinctive elements.

The development shown in figure 10 is an additional help for the composition of the drums 12 and therefore also for the choice of the inserts. Moreover, this figure also illustrates how the inserts 34 are combined with each other in a removable configuration so that they form a plurality of strings formed by the sequence of the visible faces of the inserts adjacent to each other, for example like those indicated in the rows A-H in figure 10.

The composition of each string is obtained by positioning both the key code and the code to be remembered in the transversal direction of the string itself, or in other words, in the axial direction in the case of the drums 12. In the example shown in figure 10, the column t1 could be used to show the key code, while the following columns d1, t2, d2, etc could be used to show the codes to be remembered. (in the illustrated example this can include up to twelve codes for credit cards, bank distributor cards, mobile phone cards etc.)

Once the columns of figures have been completed as shown in figure 10, is immediately available each row A-H corresponding to a string, and therefore to the composition of a drum 12,.

By following the diagram provided in figure 10 it is possible to choose the inserts to be used for each drum,

to insert them in the respective axial pins 20, arranging them so that the distinctive element is visible on the external edge of the drum. Alternatively it is possible to use inserts where the distinctive element can be written or engraved directly, thus avoiding the need of having a prepared set of inserts.

When all the drums have been completed, they are inserted in sequence in the rod 38 so that they are adjacent to each other parallel to axis 14.

At the same time the stepwise rotation means 22 is assembled together as illustrated in the cross section portion in figure 1.

The second stop 42 and the locking member 44 are mounted to close the assembly.

Therefore the rod 38, the first stop 40, the second stop 42, and the locking member 44 are the means for positioning the strings alongside each other in parallel mode so that the distinctive elements of several strings are aligned in a direction that is essentially transversal to the direction of the string itself.

Through misaligning the columns t1-d6 by rotating the respective drums (in other words by making the strings A-H slide with respect to each other) it becomes impossible to read the interesting codes. There are 12^8 possible combinations.

The secret codes that are read sideways between the strings are obtained automatically by rotating the drums (or by making the strings A-H slide with respect to each other) and lining up the distinctive elements of several strings/drums to form the key code along the transversal direction with respect to the direction of each string (i.e. corresponding with the direction parallel to the axis 14).

As described above it is easy to understand how a device such as that described in the present invention allows a user to access to a plurality of codes for credit cards, numerical locks, bank distributors, or similar codes by simply remembering one single code.

This is made possible thanks to a device that according to a possible embodiment can assume the form and size of a key ring, desk or computer accessory. They are particularly compact and lightweight, and can be made from any type of material from low cost to prestige materials.

A further advantage of the device as described in this invention is the absolute simplicity of the device structure, resulting in low production costs.

Of course other variants and/or additions can be applied to the embodiment described above.

The number, shape and size of the drum inserts and

drums can also be varied in relation to the described and illustrated embodiment

Moreover, the embodiment illustrated in figure 10 for example, could be used as a model for a device as described in this invention, manufactured in electronic form, where each insert is composed of a section on a display, which, using an appropriate program, could be aligned or misaligned in relation to the others. In this case, the concept of the removable insert could be applied using a writing system that allows the user to align several distinctive elements to form a string.

As an alternative to the example illustrated in figure 9, the stepwise rotation means can include at least one axial groove formed in one drum and designed to interact with at least one axial rib on a portion of the adjacent drum or the rod.

The inserts illustrated in the enclosed figures can be different in number, shape and size; for example, they can consist of cylindrical elements on which the side wall carries at least one distinctive element.

In particular, the inserts can be produced in mosaic tessera form for example, with a quadrangular base carrying a single distinctive element. These tesserae can be attached to the drums or other elements rotating around an axis in a direction perpendicular to the

rotation axis with a snap-on locking system to prevent them from sliding off.

The system used to attach the inserts to the drum can also be different. In the case described above, the inserts are inserted into axial pins and maintained in axial direction by the interaction with the plan 16 of the adjacent drum and/or by a snap-on system that attaches the inserts and makes them easily movable with the application of slight pressure.

As an alternative the drums 12 can comprise radial pins designed for insertion in seats formed in the inserts. Moreover, locking systems can be envisaged of the snap-on type for example, to prevent the inserts from sliding off the pins and the drums from sliding off the adjacent drums.

In the figures 13-33, the number 10 identifies another embodiment of the device for automatic reading of a plurality of codes by means of a single key code as described in this invention. The elements in common with the version already described are identified with their same reference numeral.

According to the embodiment example illustrated in figure 13, the device in question can, for example, assume the shape and size of a key ring or an accessory for application on a computer monitor, or an office desk,

and can comprise a plurality of drums 12 designed to rotate around a longitudinal axis 14.

In the example in figure 1, eight drums are provided alongside each other in a direction parallel with axis 14.

An example of embodiment of a drum 12 is illustrated for example in figures 13, 15, and 18, and includes a plurality of lobes 160. In the example illustrated, six lobes are provided for each drum. Two slots 180 are provided in each lobe 160, that pass through the drum in a direction that is basically parallel to axis 14. Each slot is adapted to receive an insert 34 equipped with at least one face carrying for example, a distinctive element, such as an alphanumeric character or a graphical symbol or colour visible inside the assembled device.

Each insert 34 is adapted to be connected in a removable manner to its respective drum inside slot 180. In a further possible embodiment, the inserts 34 are manufactured as sheets or plates suitable for insertion in the respective slots 180. The lobe 160 and therefore, the slot 180 has a lower closing wall wherein at least one opening 181 is formed for the insertion of an extractor, not illustrated, that is used to extract the inserts from the slot.

Each drum comprises a through seat 26 that is

basically cylindrically-shaped and co-axial with axis 14. The seat 26 is bounded by a side wall of the respective drum carrying ribs 240 that run in a same direction parallel to axis 14. According to a possible embodiment, the ribs 240 are preferably distributed uniformly around the circumference.

The reference numeral 38 is referred to a rod designed to receive the drums 12 placed alongside each other in the direction of the axis. The through seats 26 form a seat adapted to receive this rod 38 so that it forms the axis 14 around which said drums rotate.

According to a possible embodiment, the rod 38 has a first stop 40 fixedly attached to one end of the rod. In the example illustrated in the figures, the first stop 40 has a disk form from which extends a shoulder 300 with a hole 320 being suitable for housing for example a ring 340 or some other attachment system that makes device 10 suitable for use as a key ring.

According to a possible embodiment, two fins 360 extend in a radial direction between the first stop 40 and the end of the rod 38, for example in diametrically opposite directions. The radial extension of the fins 360 is greater than the diameter of the rod 38.

The free end of the rod 38, in other words, the end opposite that one carrying the stop 40, forms a slight

radially enlarged section 380.

The numeral 42 identifies a second stop that can be inserted on rod 38 on the end opposite to that one carrying the stop 40. This stop is adapted to be attached to the rod to block the drums axially.

According to a possible embodiment, the second stop 42 comprises a ring-shaped portion that extends radially to axially lock the drums 12 onto the rod. The numeral 420 indicates flexible fins that extend in the axial direction from the ring portion of the second stop 42. These fins are adapted to lodge the radially enlarged section 380 of rod 38.

Number 22 indicates the stepwise rotation means used to rotate each drum by a pre-determined angle with respect to the immediately adjacent drum and in relation to the rod 38. This means comprises the ribs 240 on the drums 12, and a specially shaped shaft 460 suitable for being inserted onto the rod 38, coaxially to the rod, and inside the drums 12.

The specially shaped shaft 460 is hollow, that is, it forms a through seat 480 adapted to receive the rod 38.

According to a possible embodiment, a baffle plate 500 is envisaged at a determined axial position of the specially shaped shaft 460. The baffle plate 500 includes

a hole 520 with a radial extension that is less than that of the through seat 480 but in any case, suitable for lodging the rod 38, for example through a interference fit.

According to a possible embodiment, the numeral 540 refers to two slots set in axial direction for a certain portion of the side surface that forms the through seat 480 from one end of the specially shaped shaft 460. These slots are adapted to receive the fins 360 of the first stop 40.

The specially shaped shaft 460 is basically made of hollow cylindrical wall that comprises a complete first portion 460a that extends for approximately 180° , and a second portion 460b that bears several radial notches 560 that form a series of axial sectors with various shapes. The first axial sectors identified with number 580a have a basically semi-cylindrical shape as an extension of the first portion 460a. The second axial sectors identified with numeral 580b have a basically semi-cylindrical shape with a radius that is slightly smaller than axial sectors 580a, and include a tooth 600 that extends radially outside the radial dimensions of the first sectors 580a. Each tooth 600 is adapted to be lodged between two adjacent ribs 240 on a drum 12. The number of the second sectors 580b is foreseen as being

the same as the number of drums 12 and each respective second sector is in alternate position with a respective first sector 580a. The specially shaped shaft 460 is manufactured in a material suitable to make the teeth 600 elastic and flexible.

According to a possible embodiment the number 640 indicates washers designed for insertion on the specially shaped shaft 460 in determined axial positions. According to a possible embodiment each washer 640 comprises a plurality of lobes 660 preferably the same number as the lobes 160 set on the drums 12 in the illustrated example in the figures. Four washers have been provided in the example illustrated in the figures.

Below is a description of the assembly and the method for using the device for automatic reading of a plurality of codes through a single key code as described previously.

The inserts are combined with the relative drums by choosing the insert and the respective visible face according to the key code and the codes to be remembered, as described in the previous example.

The specially shaped shaft 460 is co-axially inserted on the rod 38 so that the fins 360 are inserted into the slots 540. The mechanical coupling by insertion of the fins into the slots prevents the specially shaped

shaft from rotating around the axis 14.

Then the first drum is positioned so as to abut against the first stop 40.

The tooth 600 of the respective axial sector is inserted between two adjacent ribs 240 of drum 12.

The following elements are positioned on the specially shaped shaft 46 in order: a washer 640, two more drums 12, a washer 640, two more drums 12, a washer 640, two more drums 12, a washer 640 and a final drum.

Lastly the second stop 42 is inserted so that the flexible fins 420 are blocked there where the rod 38 has the radially enlarged section 380.

Hence, the rod 38, the first stop 40, the second stop 42 with its flexible fins form means for aligning the strings (drums) in parallel mode so as to line up the distinctive elements of several strings in a direction that is essentially transversal to the direction of the string itself. Should the rod 38 be not envisaged, the stops can be directly mounted on the specially shaped shaft 460.

The inserts are positioned in a manner so that when the drums 12 are placed alongside, the inserts of the adjacent drums form columns in the axial direction. The inserts are inserted in the respective drums to form a string so that the first column that composes the key

code corresponds with the adjacent columns that form the codes to be remembered. Therefore when the key code is composed in its respective column, the other strings will automatically form the codes to be remembered (Bank distributor, mobile phone etc.) On the other hand, when the drums are rotated and the inserts of the adjacent strings are misaligned, the codes to be remembered are not immediately readable.

The device function mode during rotation is illustrated for example in figures 31-33. In rest position (figure 31) the tooth 600 is inserted between two adjacent ribs 240.

When the respective drum is rotated, the tooth 600 is pushed radially inwards (figure 32) or it bends in a direction at a tangent to pass over the rib 240. As soon as the rib has been passed, the tooth returns resiliently to its original form (figure 33).

The provision of said stepwise rotation means allows a precision positioning of the drums to be achieved, while maintaining a simple compact structure at the same time.

It is clear that variants and/or additions to the above described and illustrated embodiments can be foreseen.

According to a possible embodiment a further stop

can be provided at one end of the specially shaped shaft 460, for example such end where slots 540 are located. This further stop could take the form of a circular ring extending radially from the specially shaped shaft 460 and locking the drums 12 in place. This stop on the shaft 460 abuts against the first stop 40 on rod 38. In this case the drums can be easily arranged on the specially shaped shaft 460 even before the shaft is fitted on the rod 38.

According to a possible further embodiment the drums can be arranged alongside each other without the need for the insertion of the washers 640.

The figures 34-36 illustrate a possible embodiment of the device according to the present invention including four units 10a which have the same structure or a similar one to that of the previously described device 10. In particular, the drums of each unit comprise a plurality of lobes or teeth so that the lobes of one unit are inserted in the cavities between two lobes on the adjacent unit. Locking means are functionally associated to the ends of such units so to maintain them side by side but to allow their rotation around the respective longitudinal axis. Such means is composed for example of a ring A that connects the ends of unit 10a, for example through insertion in holes provided for this purpose.

Said variant is conceived to operate in a way so that the rotation of a respective drum of one unit will cause the rotation of the corresponding respective drum of the adjacent unit, as if they were two gear wheels meshing together.

The original provision of a plurality of units allows a larger number of possible combinations and therefore a larger number of codes to be achieved, that can be contained in the device.

Obviously the number of the units 10a and the respective lobes, their shape and the number of drums can vary with respect to the version described.

In all the variants described and/or illustrated, the number, shape and size of the drum inserts and the drums can vary with respect to the versions already described and illustrated. The number of lobes or the shape of the drum can also vary.

The system used to fix the insert to the drum can also be designed differently.

In the case where a specially shaped shaft is envisaged the rod can be omitted, using the shaft only. Or a rod can be adopted with a square or cross-shaped cross-section.

In all the embodiments of the present invention, at least two drums (or at least two strings) can be

provided, each one comprising at least two inserts.

In order to satisfy specific and associated needs, those skilled in the art will be able to modify, adapt and replace certain elements of the preferred above described embodiment of the device with functionally equivalent ones, while still remaining within the scope of the following claims.

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